

Patent claims

1. Process for producing a weld seam (1) in hardenable steel, comprising at least the following steps:

- a) positioning a laser beam (2) with respect to a weld line (3);
- b) heating subregions (4) of the steel by means of the laser beam (2), with the laser beam (2) being guided along a welding track (5) which is longer than the weld line (3);
- c) cooling the heated subregions (4) of the steel.

2. Process according to Claim 1, in which step b) comprises a relative movement of the laser beam (2) with respect to the weld line (3) at a feed rate (13), this relative movement having a secondary movement (14) superimposed on it.

3. Process according to Claim 2, in which the secondary movement (14) is an oscillating movement with respect to the weld line (3).

4. Process according to Claim 2 or 3, in which the secondary movement (14) varies while the weld seam (1) is being formed.

5.. Process according to one of the preceding claims, in which the laser beam (2) at least from time to time penetrates through the hardenable steel.

6. Process according to one of the preceding claims, in which the weld seam (1) is produced with a width (6) of at least 1.0 mm.

7. Process according to one of the preceding claims, in which the weld seam (1) is produced for the purpose of joining at least two components (7).

8. Process according to one of the preceding claims, in which the weld seam (1) is produced by radial circumferential welding.

9. Join (8) between at least two components (7) for torque transmission made from hardenable steel, characterized in that the join (8) is at least one weld seam (1) produced by a process according to one of the preceding claims.

10. Join (8) according to Claim 9, characterized in that at least one of the components (7) is a hollow shaft with a wall thickness (9) in the range from 2.0 mm to 10.0 mm.

11. Join (8) according to Claim 10, characterized in that the weld seam (1) is formed over the entire wall thickness (9).

12. Join (8) according to one of Claims 9 to 11, characterized in that the join (8) and adjoining subregions (4) of the components (7) are designed to be crack-free.

13. Join (8) according to one of Claims 9 to 12, characterized in that the join (8) has a ductility in the range from 250 HV to 650 HV.

14. Vehicle (10) comprising an engine (11) with a drive system (12), characterized in that the drive system (12) has components (7) for torque transmission, and at least two components (7) have been welded together by a process according to one of Claims 1 to 8, or in that the vehicle (10) includes a join (8) according to one of Claims 9 to 13.